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Indian Standard

ELECTRIC RESISTANCE WELDING—INTEGRATED TRANSFORMERS FOR WELDING GUNS

ICS 25.160.30; 29.180

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

February 2003 **Price Group 4**

Industrial and Production Automation Systems Sectional Committee, BP 18

NATIONAL FOREWORD

This Indian Standard which is identical with ISO 10656:1996 'Electric resistance welding — Integrated transformers for welding guns' issued by the International Organization for Standardization (ISO) was adopted by the Bureau of Indian Standards on the recommendation of the Industrial and Production Automation Systems Sectional Committee and approval of the Basic and Production Engineering Division Council.

The text of the ISO Standard has been approved as suitable for publication as Indian Standard without deviations. Certain conventions are, however, not identical to those used in Indian Standards. Attention is particularly drawn to the following:

a) Wherever the words 'International Standard' appear referring to this standard, they should be read as 'Indian Standard'.

b) Comma (,) has been used as a decimal marker in the International Standard while in Indian Standards, the current practice is to use a point (.) as the decimal marker.

Where there are no corresponding Indian Standards for the International Standards referred in this Indian Standard, reference to the relevant International Standard may be made.

Technical Corrigendum 1 to the above International Standard has been incorporated.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2:1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

IS 15295 : 2003
ISO 10656 : 1996

Indian Standard

ELECTRIC RESISTANCE WELDING—INTEGRATED TRANSFORMERS FOR WELDING GUNS

1 Scope

This International Standard specifies transformers for electric resistance welding used in welding guns with integrated transformers (robot guns).

For these transformers it supplements the requirements given in ISO 5826 which remain applicable when not amended in this International Standard.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 5826:—[1], *Transformers for resistance welding machines — General specifications applicable to all transformers.*

IEC 417:1973, *Graphical symbols for use on equipment. Index, survey and compilation of the single sheets.*

3 Types of transformer (variable length dimensions)

Length dimensions and electrical characteristics for transformer types are given in table 1.

The transformers are suitable for duty cycles up to 20 % (see annex A).

Table 1 — Types of transformer, lengths and electrical characteristics

Type	No-load voltage U_{20} V	l_{1max} mm	l_2 mm	Continuous secondary current I_{2p} kA	Weight (approximate) kg
H	4,5	245	170	4	18
H	5,6	270	170	4	23
J	6,3	275	190	5,4	26
J	7,1	295	190	5,4	29
J	8	310	230	5,4	32
J	10	370	260	5,4	39
J	13,5	460	350	5,4	52

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[1] To be published. (Revision of ISO 5826:1983)

4 Dimensions

The dimensions of type H transformers shall be as given in figures 1 and 2.

The dimensions of type J transformers shall be as given in figures 3 and 4.

5 Construction, additional equipment

5.1 Earthing

The centre point of the secondary coil shall be earthed by a removable link.

5.2 Thermal protection

Primary and secondary coils of the transformers shall be equipped with thermostats having contacts that are normally closed. The position of the wiring shall be according to figures 1 and 3. The insulation shall be adequate for the test conditions of this International Standard.

The colour code of wiring is as follows

primary wiring: sky blue

secondary wiring: black

5.3 Current detector

The secondary coil shall be equipped with a device for the measurement of the secondary current having the following characteristics:

degree of protection: IP 55;

output: 150 mV/kA, + 1,5 % to − 1,5 % at a load of 1 000 Ω under full wave, full voltage conditions up to 80 °C with a tolerance after mounting in transformer of ± 3 %.

The internal resistance of the detector shall be 10 Ω to 50 Ω. The detector shall be a toroidal coil and not a cylindrical coil.

The colour code of wiring is white and brown.

5.4 Mechanical strength

After being tested according to 9.1, the transformer shall have no permanent deformation.

6 Marking

Identification for the earth and two voltage connections shall be clearly marked: U, V and the symbol ⏚ (see IEC 417).

The polarity on the secondary side should be indicated on the transformer and/or the data sheet.

6.1 Name plate

The name plate shall conform to ISO 5826.

6.2 Colour of exterior finish

See table 2.

Table 2 — Colour code following no-load secondary voltage

No-load voltage U_{20} V	Colour
4,5	orange
5,6	lilac
6,3	blue
7,1	green
8	grey
10	yellow
13,5	brown

7 Shipping

All holes shall be closed. The cooling tubes shall be drained and the ends plugged. The terminals shall be protected to avoid damage during shipment and storage.

8 Designation

The designation of a transformer for welding guns which comply with the requirements of this International Standard shall comprise the following information in the order given:

a) the complete designation (i.e. "Transformer");

b) reference to this International Standard;

c) the type of transformer (e.g. "J");

d) no load voltage U_{20}, secondary current I_{2p}, nominal primary voltage U_{1n};

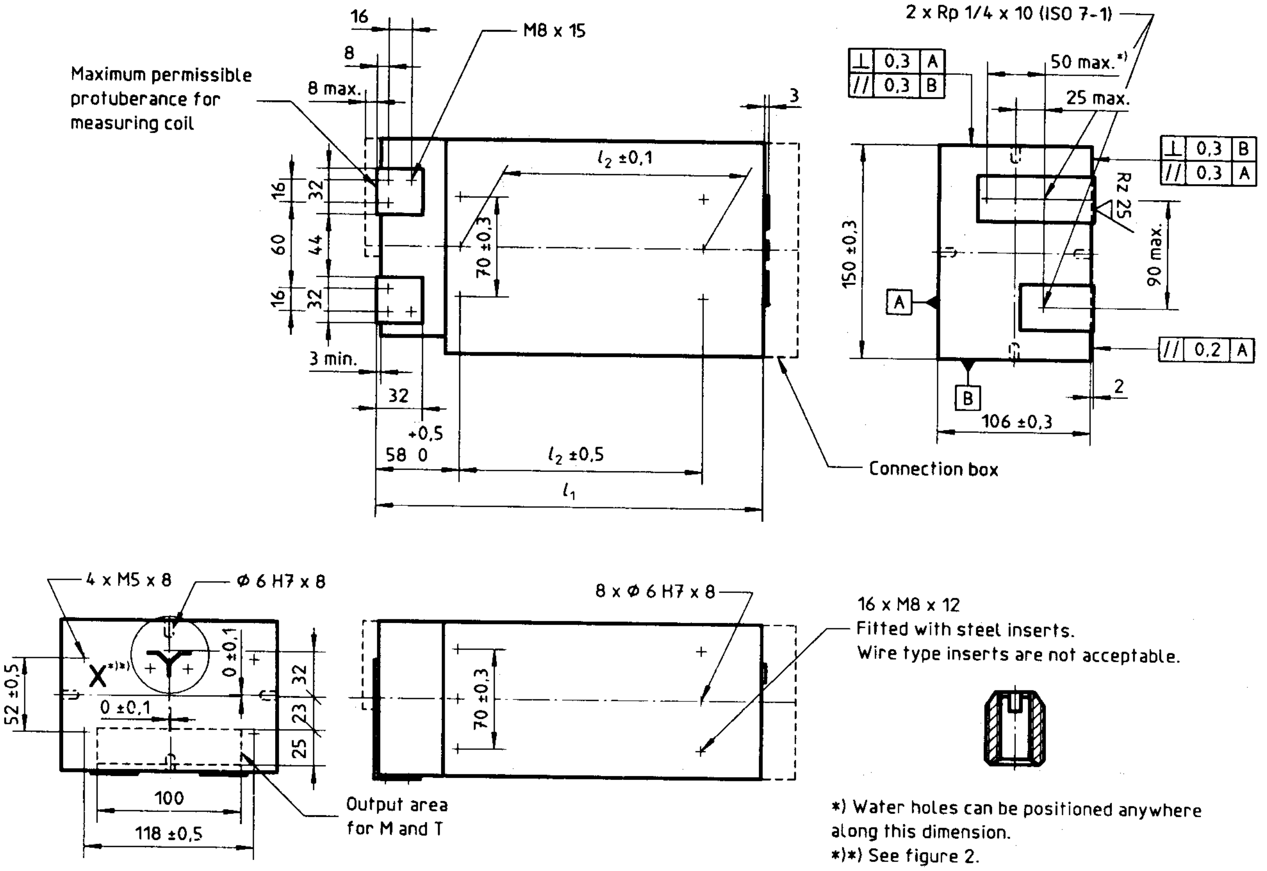
e) indication of thermal protection T;

f) indication of current detector M.

EXAMPLE

Transformer ISO 10656 - J - 7,1 - 5,4 - 400 - TM

Dimensions in millimetres

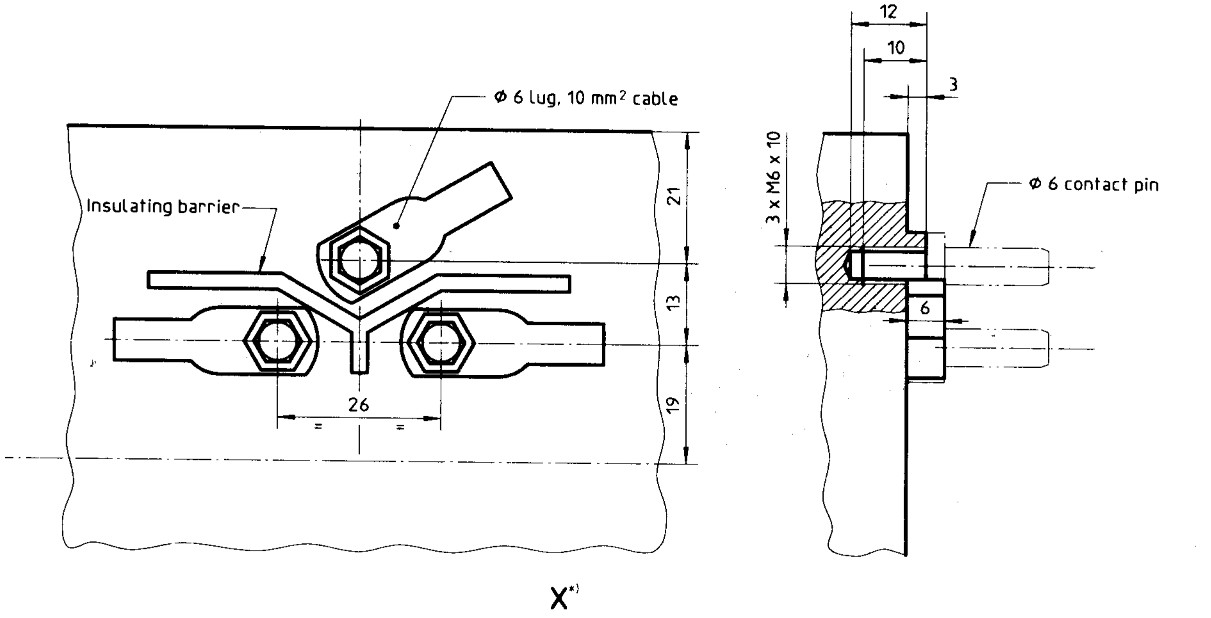


*) Water holes can be positioned anywhere along this dimension.

)) See figure 2.

Figure 1 — Dimensions of type H transformers

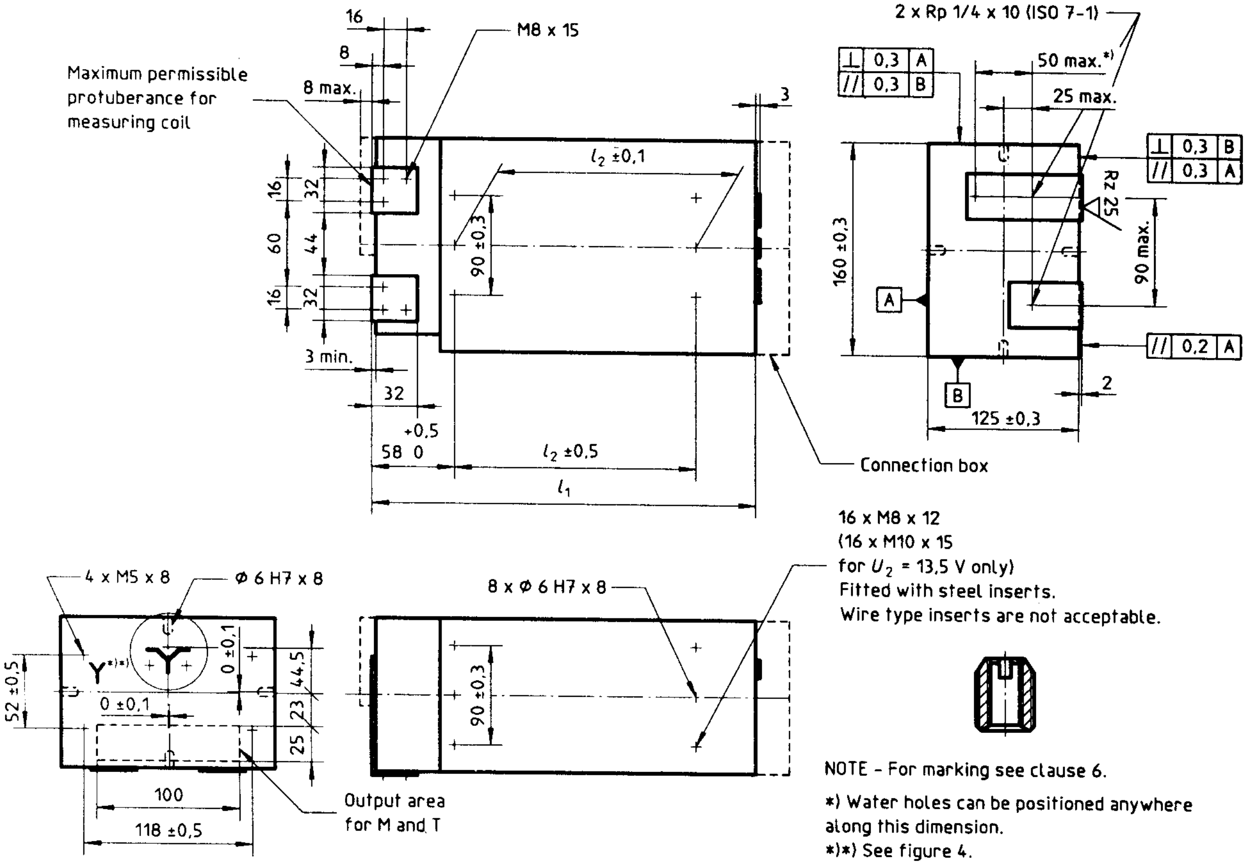
Dimensions in millimetres



*) See figure 1.

Figure 2 — Size and location of the 3 M6 holes intended for supply connection of type H transformers

Dimensions in millimetres



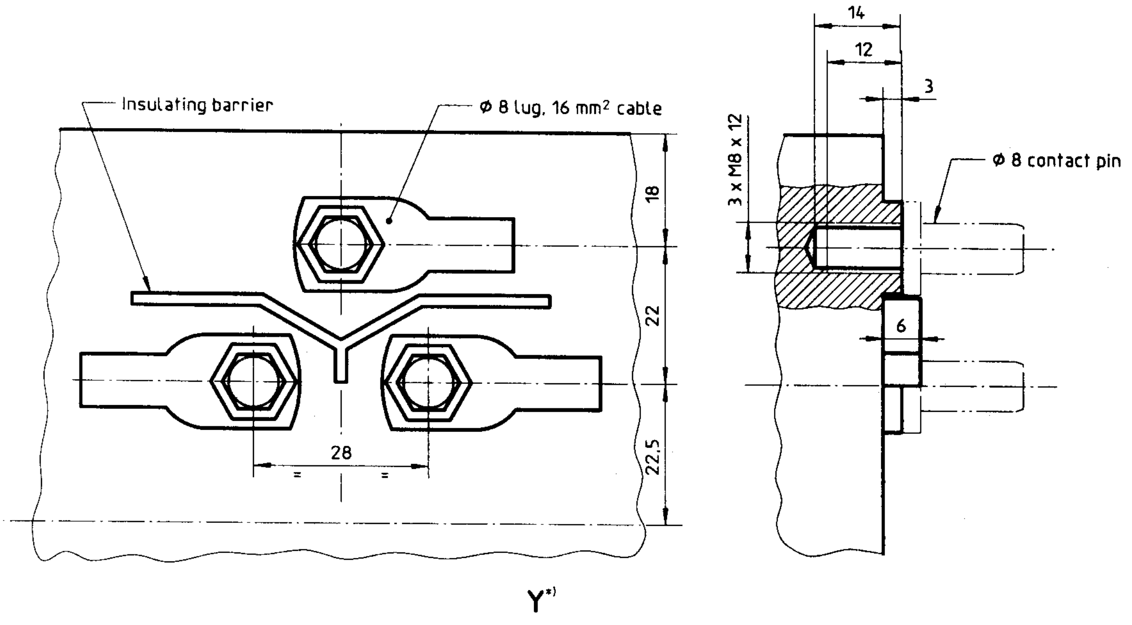
NOTE - For marking see clause 6.

*) Water holes can be positioned anywhere along this dimension.

)) See figure 4.

Figure 3 — Dimensions of type J transformers

Dimensions in millimetres



*) See figure 3.

Figure 4 — Size and location of the 3 M8 holes intended for supply connection of type J transformers

9 Testing

Tests shall be those as given in ISO 5826 when not amended in this clause.

The following additional tests are required.

9.1 Mechanical strength

The transformer shall be solidly secured on two plates through the four M8 or M10 fixing holes of two opposite faces and a tensile load of 10 kN shall be progressively applied to the faces so that maximum loading is obtained after 1 min, and maintained for 1 more min. The test shall be repeated on the other two faces.

9.2 Current detector

The testing of current detector shall be left to the discretion of the manufacturer, providing the requirements in 5.3 be fulfilled.

9.3 Insulation of thermostats

The thermostats and their connecting circuits shall withstand a test voltage of (2 U_{1n} + 1 000) V for 1 min.

9.4 Dielectric tests

Voltage is gradually increased from 0 V up to:

primary - secondary	4 kV
primary - case	4 kV
secondary - case	1 kV

each test lasting 1 min.

9.5 Thermal test

The heat rise and temperature limits shall conform to ISO 5826 up to a duty cycle of 20 %.

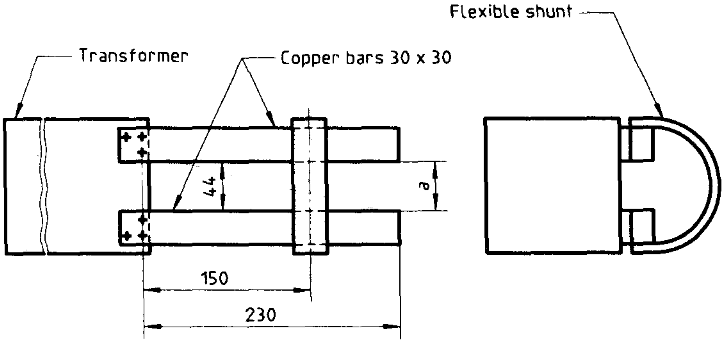
The test shall be done with nominal primary voltage at a load time of 240 ms and a duty cycle of 20 %. The cooling water flow shall be 4 l/min.

9.6 Dynamic type test of the outlets

The transformer shall withstand the dynamic efforts brought about by a repetitive flow of welding current which shall be as high as possible, but not more than 5 times the permanent current, in the conditions shown in figure 5.

The value of a is measured before and after the tests. After the 2 500 cycles, the variation of secondary outlets shall not involve an increase of a by more than 10 mm.

Dimensions in millimetres



Number of cycles to be performed:	2 500
Welding current:	5 × I_{2p}
Welding time:	160 ms
Duty cycle:	1 %

Figure 5 — Device for the dynamic type test

Annex A
(informative)

Secondary current and duty cycle

(See figure A.1)

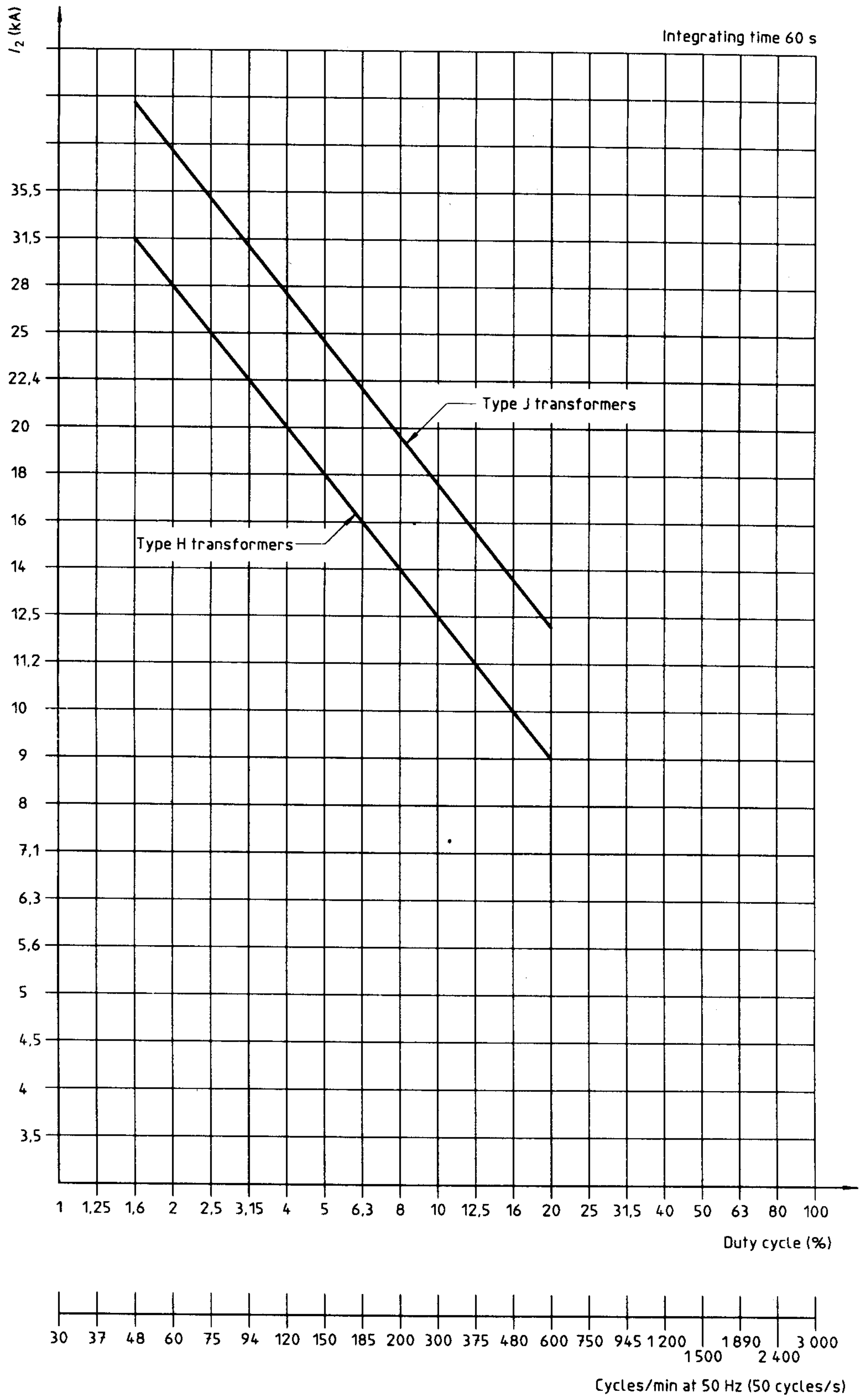


Figure A.1 — Relationship between secondary current I_2 and duty cycle

Annex B
(informative)

Bibliography

[1] ISO 1302:1992, *Technical drawings — Method of indicating surface texture.*

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This Indian Standard has been developed from Doc: No. BP 18(0301).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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Printed at Simco Printing Press, Delhi